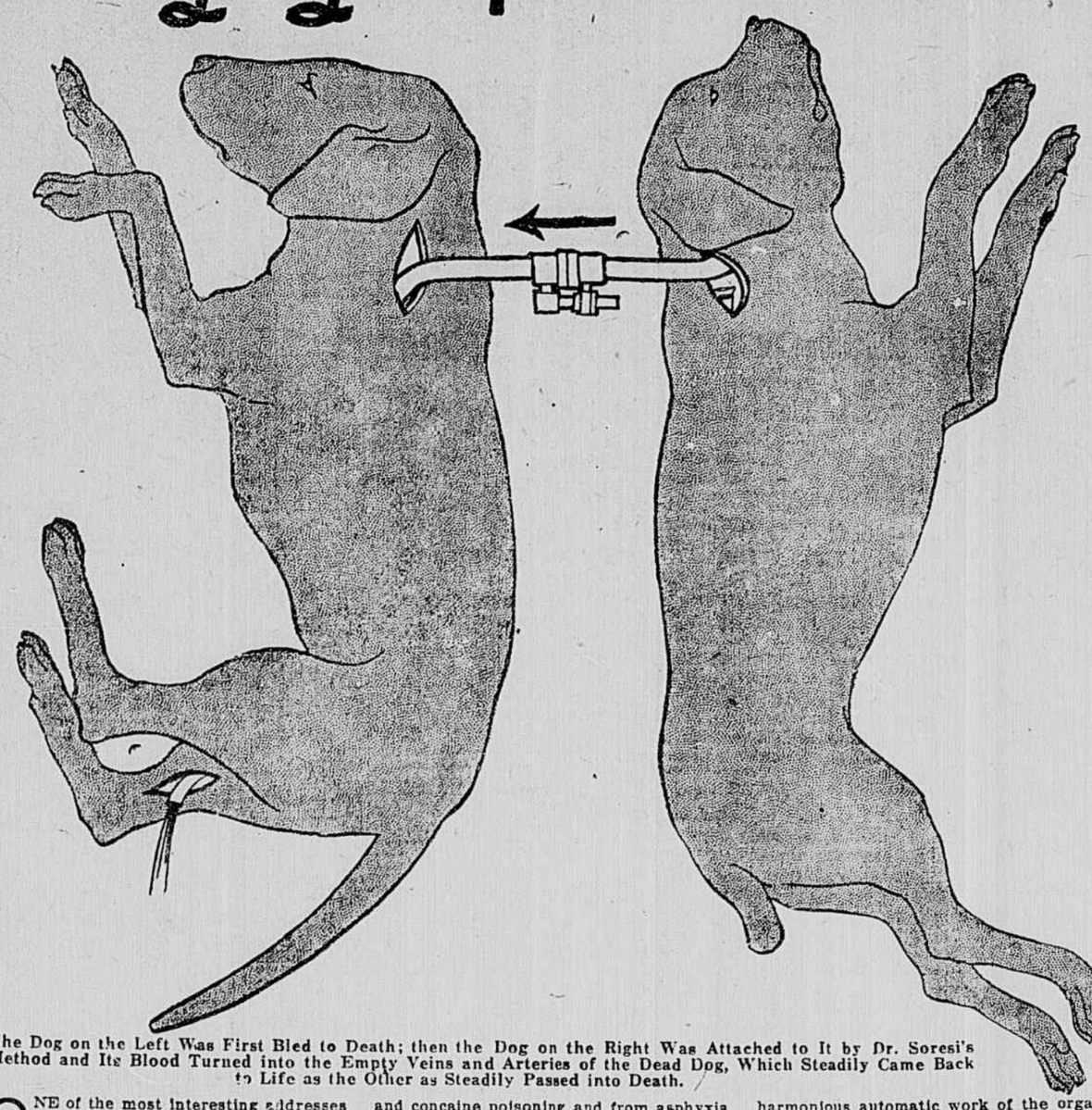
Bringing People Who Have Bled to Death Back to Life

Remarkable Discoveries of an American Surgeon Which Are Long Steps Toward the Day When No Injury Can Be Fatal and There Will Be No Vital Organs



The Dog on the Left Was First Bled to Death; then the Dog on the Right Was Attached to It by Dr. Soresi's Method and Its Blood Turned into the Empty Veins and Arteries of the Dead Dog, Which Steadily Came Back to Life as the Other as Steadily Passed into Death.

ONE of the most interesting addresses delivered at the recent great International Congress of Medicine, in London, was by Dr. A. L. Soresi, of New York.

Dr. Soresi described how he had brought animals to life nine minutes after their hearts had stopped beating by direct transfusions of blood from other animals. He argued that the same method would revive all cases of death from morphine, ether and concaine poisoning and from asphyxia and hemorrhage.

He decribed how his method of blood transfusion had saved many children dying from abnormal bleeding. He referred to a technic of joining severed nerves and blood vessels which would enable him to graft the limbs of dead persons on to living persons who needed them. Surgeons were of the opinion that Dr. Soresi could avoid many of the defects of Dr. Carrel's method of grafting. The most interesting passages of Dr. Soresi's addresses follow:

By Dr. A. L. SORESI, of New York,

Before the International Congress of Medicine.

IT IS generally stated that there are organs, such as heart, liver and brain, essential to the maintenance of life, severe injury of which would cause death.

This assertion must now be taken with the modification that what we are compelled to admit to be a fatal injury at the present time may not be so in the near or distant future. So, if it is true that the loss, for instance, of the arms or legs, or of both, might not cause death, and the person who suffered the loss might live as long as if there had been no loss, this is due, in addition to the development of our surgical technic, to social conditions. The same loss would prove fatal to a person isolated from other human beings, as he would be unable to gather food or carry it to his mouth, and as a consequence would starve to death. Years ago it was thought that the stomach was an organ essential to life; now we can safely remove that organ without immediate loss of life, although the person who suffers the loss is predisposed to immature death from poor digestion.

Asphyxia, wounds of the heart, etc., were considered fatal only a few years ago, and are so now where the emergency facilities are not at hand. Up to the present day a stab wound of the abdominal aorta, with its sudden and appalling hemorrhage, is considered fatal, but below experiments will be described in which life was restored, although for as long as nine minutes the heart had already stopped beating.

When a person is declared dead, and is really so, it does not mean that all his organs are individually dead. The great majority of them could be transplanted to other individuals, and under favorable circumstances would live indefinitely. Life must be understood as the result of the harmonious automatic work of the organs constituting the body. The word automatic has to be emphasized, because the phenomena occurring when life is kept on artificially cannot be considered as life. For instance, a decapitated animal cannot be said to be alive, although it is possible to maintain circulation, respiration and the digestive function for a certain time after the head has been severed from the body. This proves that each organ can live an independent life for a certain length of time, but that life is present only when the organs of the body are working automatically in a harmonious way, because each accomplishes certain functions which supply energies and stimuli to the others. It also shows the role of the nervous system to be the great co-ordinator of all the others.

In certain respects the living body can be compared to an automobile. The role of the nervous system in regard to the functions of the body corresponds to those of the chauffeur, steering brakes and wires in the automobile. A serious damage to the nervous system causes definite death, because the organs, if they work at all, do not work harmoniously, each disturbing the other, until the harmonious automatic work ceases and thus ends life. The importance of the nervous system can well be understood in cases of asphyxia, for instance. There have been numerous cases of gas poisoning where the patient was brought back to life with almost normal respiration, circulation, etc., but failed to live because the nervous system had been damaged to such an extent that its co-ordinative power was lost.

The most difficult problem to be met in resuscitation is the reactivation of the heart's function. The technical difficulties concern the impossibility at the present time of entering the left heart without producing irreparable damage. If the left heart could be entered with some stimulating liquid as easily as the right, life could be re-established without much difficulty. The reason is that the coronary arteries supplying the heart have their origin in the left side of the organ, and death being considered as asphyxia anemia, or anesthesia of the heart, it is evident that better results than those now met with could be obtained if a technic of supplying the heart with a fresh, stimulating liquid which would wash out all the waste products and supply new stimuli could be developed.

It is not an exaggeration to state that all cases of poisoning from morphine, cocaine, ether and chloroform, as well as from asphyxia and hemorrhage, could be revived after the patients had been pronounced dead for a certain length of time, if the coronary vessels of the heart could be flushed with stimulating solutions.

In my numerous experiments I have found that the liquid that best stimulates and reactivates the heart action is fresh blood. The most gratifying results have been obtained up to the present time in reviving animals dead from hemorrhage. I have bled animals to death by severing the femoral artery; artificial respiration was maintained by pumping air or other gas through the trachea; the thorax was opened and the heart exposed. When all heart beating had stopped artificial respiration was also stopped at times, and at other times kept up. Direct transfusion of blood was resorted to through the external jugular vein. Heart beating and life could be restored up to seven minutes after heart beating had completely stopped. No result could be obtained if instead of blood other stimulating liquids were used.

I have found my method of direct transfusion of blood very useful in cases of pathological hemorrhage (abnormal bleeding). Among the patients thus treated are those know as "bleeders," who bleed through the mucous cavities of nose, mouth, etc., at the slightest shock.

Blood transfusion hitherto has failed technically in the hands of the very best surgeons. The reason of the failure is that when transfusion is not properly performed a clot forms between the blood vessel of the donor and the blood vessel of the recipient. The clot will not allow the flowing of the blood from one to the other. All my efforts are directed to prevent the formation of a clot at the point of anastomosis.

From the time that transfusion was first attempted, doctors have used a blood vessel of the donor in which the pressure was high, or have raised such pressure by artificial means. This has been done under the impression that the stream of blood coming from the donor under high pressure would overcome the pressure in the veins of the recipient, and so the blood of the donor would flow easily into the recipient.

The commonest procedure is to anastomose the radial (wrist) artery of the donor with a vein of the limb of the recipient. As the blood of the radial artery is under about seven times as much pressure as the vein of the recipient, it seems logical to reason that the blood of the donor will flow freely into the system of the recipient. That this does not always occur is proved by the many failures of direct transfusion of blood.

The blood of the donor does not flow freely, as is commonly supposed, and this is evident from the fact that transfusion is generally kept up for from one-half to one hour. A rough estimate of how much blood the donor would lose in that time from a severed radial artery clearly shows that the death of the donor would result if the blood was flowing freely. Rarely the blood is flowing so rapidly from the donor to the recipient that the flow has to be slowed down by compression of the artery. In these cases, and only in these, is the blood flowing freely from the donor to the recipient.

Why, then, does the blood not flow in every case from the artery of the donor into the system of the recipient? Because the technic of using an artery of the donor and a vein of a limb of the recipient is wrong. To make the blood flow freely from donor to recipient, the blood of the donor should flow without any obstacle directly into the heart of the recipient. This is accomplished by using the external jugular vein of the recipient, and is explained by the laws regulating the circulation of the blood. When the blood leaves the blood vessel of the donor and enters the vein of the recipient, it is no more under the influence of the heart of the donor, but under the influence of the heart and blood vessels of the recipient exclusively, and in order to circulate it must reach the heart of the recipient.

Why this does not occur is easily explained. Blood pressure is highest at the left heart and negative at the right. This difference in pressure assures the circulation of the blood, which depends mainly on these factors; the blood is contained in a closed elastic system of vessels beginning and ending in the heart, which acts as a double pump by rhythmic continuous movements of expansion and contraction. The blood will flow where it meets least resistance, so an animal can be bled to death by severing any blood vessel and keeping its lumen opened, because there is no obstacle to the blood flowing out. In some pathologic conditions, such as shock or severe hemorrhage, the superficial blood vessels are almost bloodless and therefore collapsed. The blood flowing from the artery of the donor meets a great obstacle in the resistance offered by the narrowing of the lumen of the veins of the recipient.

The veins have numerous ramifications, so that the further the blood flows the more resistance it meets. With increased resistance there is diminution of pressure, because the width of the bed in which the blood is flowing, when contained in the artery, is enormously increased in the venous system of the recipient.

By using a vein of the neck of the recipient the conditions for the flowing of the blood from the donor are quite different from the conditions described above when using a vein of a limb. The pressure of the blood in the veins of the neck of the recipient is negative, and even in the most extreme anemias cannot oppose any resistance to the blood flowing from the vessels of the donor. As the blood flows where there is least resistance, by anastomosing the vessel of the donor with the vessel in the neck of the recipient, the blood will flow very freely from the vessel in which the pressure is position to the one where the pressure is negative. By using a vein of the neck of the recipient the blood coming from the donor falls directly into the heart of the former, aided by the suction of the heart during diastole and by the changes in pressure in the chest during the inspiration and expiration.

Recent experiments have convinced me that the best technic is to use a vein for both donor and recipient. It is extremely easy to find a good-sized vein in the arm of any adult as donor. For the recipient the external jugular vein should always be used, for the physiologic reasons explained above and because the greatest difficulty met in performing transfusion in children is due to the fact that their superficial blood vessels are very small. It was then necessary to use the external femoral, which is of pretty good size, but not very superficial, while the external jugular is both superficial and of sufficient size even in infants.

General anesthesia is absolutely contra-indicated; in many cases it would be suffcient to produce the child's death, and it is not at all necessary. Cocaine solution, 1 to 500, is sufficient to produce perfect anesthesia.

Remember that transfusion must proceed slowly; if the blood is flowing too rapidly make slight pressure on the donor's vein. Transfusion should last only a few minutes; a child does not need much blood.

Rapid repair of blood vessels and heart have been accomplished by a new technic which I have devised, but not yet published. The technic is as follows: Small gold wires are bent so as to form an arc with two very small points in the inside of the arc. The intima of the cut blood vessel is brought into perfect contact by squeezing the little gold wire, as is done for skin clippings; for the heart the clippings are double, so as not to cut the tissues during contractions.

Artificial respiration has been made either by simple traction on the tongue and pressure over the chest, or by a special pump, so constructed that the tube going into the trachea is airtight, thus not allowing any escape of air between the tube itself and the trachea. By a system of double pumping a given amount of air or any gas, alone or in combination, can be forced under a given pressure into the lungs and aspirated from them.

In the prevention of death the heart is the important element to consider, as there can be no profound coma or apnea without loss of life. The question is not one of stimulation of the heart so much as of saving its strength. In pneumonia, for instance, death could be prevented if the heart action could be kept up for a few days, the problem here being one of heart action only because the disease exhausts itself in a few days. The heart is flushed with blood loaded with poisoned products, and while its stimulating and nutritious element, the blood, is nourishing it poorly and poisoning it, it has to work harder because of the resistance met from the consolidation of the lung tissue.

With these considerations in view I have in two cases resorted to direct transfusion of blood into the external jugular vein, after having bled the patient, in order to let out the poisoned blood. In another case I resorted to continuous dropping of physiological solution into the external jugular vein. The results were very gratifying.

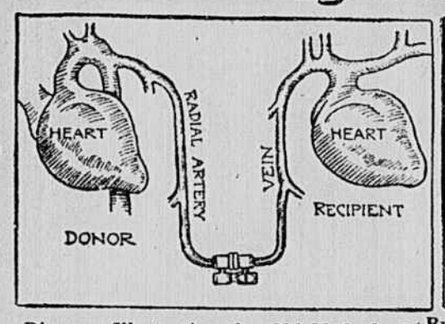
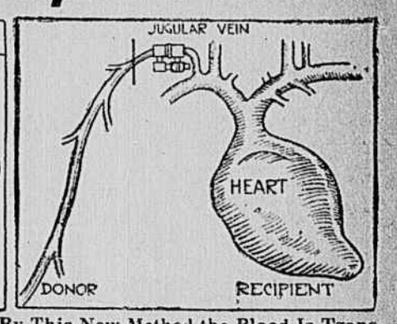


Diagram Illustrating the Old Method of Blood Transfusion by Connecting an Artery in the Donor's Arm with a Vein in the Recipient's Arm.



By This New Method the Blood Is Transfused from the Donor's Vein Into the Recipient's Jugular Vein, from Which It Passes on to the Heart in the Shortest Possible Time, and with the Least Resistance.

Photograph Showing the Line of Incision for Transfusing Blood Into a Person.

Transfusing Blood from an Artery in a Man's Arm into His Wife's Jugular Vein. During the Operation the Blood Vessels Are Continuously Flushed with a Warm Saline Solution from the Irrigator, as Shown in the Upper Part of the Photograph.

New York Girl's Great Feat of Mountain Climbing

London, Oct. 4.

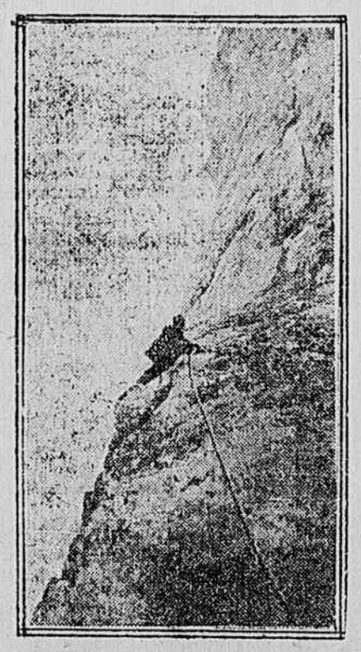
GEN. SIR ALFRED TURNER, who has recently been in the Alps, relates a thrilling achievement of a New York girl, which is unparalleled in the records of mountain climbing among women. General Turner said to your correspondent:

"A remarkable feat of courage and endurance was accomplished from Engelberg on August 28 by Miss Edith Welsh, a young American lady.

"Titlis is the highest of the mountains in the locality, and though it can only boast of an altitude of 10,686 feet, Engelberg, the starting point, is some 3,300 feet above the sea, while Zermatt is 5,300 feet and the Schwarzsee 7,541 feet, and the Matterhorn, which Miss Welsh ascended on August 23, is 14,865 feet; so that the height to be surmounted was greater in the case of Titlis.

"The latter mountain, ascended by the ordinary route from the Trubsee, is considered to be one of the most accessible of the Swiss snow giants and only requires a trustworthy guide and good condition in the climber. It has been climbed many thousand times.

"The northern wall, however, had long been held to be inaccessible; from the valley at Herrewinte it appears to be quite perpendicular up to a height of nearly 8,000 feet, where the glacier commences.



Miss Edith Welsh Climbing a Perpendicular Wall Nearly 8,000 Feet High in the Swiss Alps.

"The first ascent on this side was made last year by an Englishman, Mr. Kirkwood, the second by Miss Welsh. Accompanied by the guides Hermann Hess and Eugen Kuster, she left Engelberg at 6:15 a. m., and proceeding up the Hohfad Alp commenced the ascent of the northern face at 8 a. m.

"For eight hours the party led by Kuster, toiled up this nearly perpendicular precipice, the difficulties of which were found by Miss Welsh to be incomparably greater than those of the mighty Matterhorn; so great were they that the guides found it advisable to climb in stockings.

"Two hours more were spent crossing the glacier and descending the Laubergrat to the Trubsee Hotel, and at 8:30 p. m. Miss Welsh reached Engelberg, where she deservedly received an ovation.

"It is probable that such a difficult and almost unknown ascent has never been made before by a lady, and Miss Welsh has performed an unprecedented achievement of which her country may well be proud, especially in these days of international physical competition, in spite of the utterance of her distinguished, but cynical compatriot, who said he did not know who was the greater fool—the man who climbed a mountain only to come down again, or he who, there being two ways of doing a thing, chose the more difficult. Miss Welsh comes from New York City."